

CLAIMS

1. An optical connector comprising a plurality of insertion holes for inserting optical fibers therein, said insertion holes being provided at predetermined intervals, the accuracy of the center-to-center dimension between said insertion holes adjacent to each other being within $\pm 0.5 \mu\text{m}$, the degree of parallelization in the hole axis direction between said insertion holes adjacent to each other being within ± 0.1 degree.

2. The optical connector according to claim 1, wherein said insertion holes are arranged in a two-dimensional honeycomb form.

3. The optical connector according to claim 1 or 2, wherein, in said insertion holes, the insertion hole end on the optical fiber insertion side has been tapered.

4. The optical connector according to any one of claims 1 to 3, which comprises a substrate formed of a material selected from the group consisting of glass composed mainly of silicon oxide, glass ceramic, quartz glass, translucent alumina, and zirconium oxide.

5. The optical connector according to any one of claims 1 to 4, wherein said optical connector is a ferrule for optical communication or a fiber array for optical communication.

6. A method for manufacturing the optical connector according to any one of claims 1 to 5, wherein said method comprising the steps of:

fixing a substrate for said optical connector;

regulating the hole axis direction on an optical fiber insertion side in said fixed substrate; and

forming insertion holes in the substrate with regulated

hole axis direction by pulsed laser beam machining.

7. The method according to claim 6, which further comprises the step of, in forming the insertion holes by pulsed laser beam machining, shaping the end of said insertion holes into a taper of a predetermined angle.

8. The method according to claim 6 or 7, which further comprises the step of etching the inner wall of said insertion holes and taper part formed by said laser beam machining.

9. The method according to any one of claims 6 to 8, wherein said pulsed laser beam is a femtosecond laser beam.

10. The method according to any one of claims 6 to 9, wherein said etching is carried out with at least one inorganic acid selected from the group consisting of hydrofluoric acid, hydrochloric acid, nitric acid, and sulfuric acid.

ABSTRACT

There is provided a multi-cored ferrule for optical communication or fiber array for optical communication as an
5 optical connector that has high dimensional accuracy, can easily be prepared by machining, and is low in cost. The optical connector comprises a plurality of insertion holes for inserting optical fibers therein, the insertion holes being provided at predetermined intervals, the accuracy of the center-to-center
10 dimension between the insertion holes adjacent to each other being within $\pm 0.5 \mu\text{m}$, the degree of parallelization in the hole axis direction between the insertion holes adjacent to each other being within ± 0.1 degree.